Prologue

Mission Time: 1 hour and 29 minutes, Monday, 12 November 1984, the Moon

Kafira was two hundred and fifty yards away from the Lunar Module, skipping across the pumice-like ground, marvelling at the sight that surrounded her. She absorbed the eerie half-light, the clear, dark, starry sky, with Earth hanging like a giant blue ball in the distance. As her feet kicked at the ground, she could see and feel that there was no wind. She felt secure in herself, almost exhilarated.

The Moon has thirteen days of sunlight and thirteen days of darkness. Today was the fifth day of the thirteen-day sunlight cycle, so there was sufficient time to carry out the mission plan. The mission time clock was started on landing, and they had been on the surface for one hour and twenty-nine minutes before Kafira exited the module.

Kafira bounded along the surface of the Moon. So far, the excursion was going to plan. She could still see the module if she stopped and turned around, and she knew that Frank would be watching her life support telemetry. Kafira looked ahead; she was aware that she had another two hundred yards to go before she arrived at the mission's target. The designated landing zone was missed on the way down to the surface by about two hundred yards, but Frank—the module pilot—did not seem to be concerned. Kafira was somewhat anxious. They were close to the edge of the dark side, which meant that radio communication to Earth was likely to be weak and unstable. She heard the mechanical voice of Frank through her headset.

"Kaffie, you are two hundred and fifty yards out by our laser rangefinder. Are you still comfortable?" *I know how far out I am*, she thought. She had been keeping a close eye on her rangefinder. She had checked her suit and equipment—as she and the crew had done so many times before in the simulator—after she had stepped down the ladder onto the powdery grey surface of the Moon. Perhaps she was

breathing faster than she normally did; but hey, she thought, it isn't every day that you get to walk on the Moon.

"All my systems check, Frank. Suit pressure is slightly low but will adjust."

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"What was your suit pressure on exit?"
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"4.7."

"What is it now?"

"4.5."

"Please monitor it carefully, Kaffie. If you have to adjust it again, it is possible that you have a leak somewhere."

"Okay. Thanks, Frank."

Kafira glanced at the digital pressure gauge on her wrist and saw that it had dropped to 4.2. She adjusted the pressure and heard the swish as it increased to 4.7. She wasn't overly concerned, even if there was a slight leak; she knew that she had plenty of oxygen, and the CO₂ scrubbers were working well, noting the levels were just below 0.09 percent.

Kafira's suit was designed to be durable yet flexible, made of a composite layer that was three-sixteenth of an inch thick. The upper torso was a moulded plastic shell that fitted her body shape perfectly, but it was also strong enough to bear the weight of her life support pack. Perhaps, more importantly, the suit was also designed to prevent micrometeorites from penetrating the outer skin.

Kafira felt a slight chill as the pressure rose. She started to feel a sense of anxiety; it was undefined, and yet it was there. The anxiety began to turn to a real awareness that something was not right. She checked the pressure gauge again—it had fallen back to 4.2. She called Frank to express her concern.

"Frank, I don't feel comfortable with the pressure control in my suit. I adjusted it up to 4.7, but in the last minute, it has dropped to 4.2. I'm starting to feel hot. Can you monitor my readings to see what's

happening?"

After what seemed like an interminable wait, Frank's calm voice boomed over the intercom. "I can see what you mean, Kaffie. I want you to come back to the module. Let's see what's going on. Is that clear?"

"Okay, Frank," she replied.

As Kafira pivoted to face the way she had come, she caught a flash in the corner of her eye. She turned her head to the direction of the flash, and her pressure alarm started to beep. She looked at her wrist display and saw that the suit pressure was now down to 3.8. Quickly, she adjusted the pressure; it didn't make 4.5.

Mission Time: 1 hour and 37 minutes

As her eyes scanned the area for the source of the flash, Kafira stumbled and tripped on the uneven surface. Her feet disappeared from under her, and she found herself sprawled on her back on the powdery, pumice-like surface. She wasn't hurt, but she knew that getting to her feet again would not be an easy task. She tried to roll over by lifting her right leg above and across her body to provide the necessary momentum. It didn't work—she wasn't strong enough to raise her leg enough to roll. *Hmm*, she thought. *This is going to be difficult*.

The Command Service Module was passing overhead, and the CSM commander's voice came over the intercom.

"Kaffie, this is Paul. I can see you, and you have to stand up otherwise your support pack will overheat."

"I know," grunted Kafira. "I can't – I can't raise my legs enough to roll." She fumbled for the intercom switch again. "Frank, I don't know if you can see me on the ground," she said in a strained voice. "I just tripped. I'm on my back, and I can't get up. Frank, my suit pressure is down to 3.0." Kafira knew she was in trouble. She started to panic. "Guys, I'm getting very hot! What I am supposed to do?"

"Kaffie, I am leaving the module now, and I will be with you in six minutes."

"Kaffie, this is Paul. Stop trying to roll over! You are using too

much energy and oxygen."

"Thanks for that, Paul, but I can't–I can't just lie here and do nothing." She checked her pressure gauge. "Suit pressure is down to 2.7.CO₂ is climbing." The stars above her started to spin. "Frank, make sure to record my readings." Her voice was faltering and shaky.

Mission Time: 1 hour and 40 minutes

"Frank, this is Paul. I've turned off Kaffie's intercom so she can't hear us. There's something seriously wrong here, and you need to get her back into the LM as soon as you can."

"I'm out of the module now, heading towards her. It'll take me five minutes to get there."

Frank was outwardly calm, but he acknowledged what Paul was implying. If he didn't get to her in five minutes, at the rate she was losing oxygen, she would die of hypoxia.

"Kaffie, this is Frank. I am out of the module and heading towards you. I should be there in five minutes. Can you estimate the rate at which you are losing pressure?"

Kafira's reply came through slow and laboured. "Okay. I'm having trouble breathing...and focusing. Uh— The pressure drop rate. It's about— Uh, about 0.3 every minute...Pressure is now 2.4."

She looked at the stars and blinked, trying to pull them into focus. She tried to remain calm, but with every passing second, she grew more and more anxious. *If Frank doesn't get to me soon, I'm probably going to die. This is not the way I wanted to die, so come on, Frank!* As blackness descended upon her she asked in a trembling voice, "Frank, how– How far away are you?"

"Not far, Kaffie. Another minute or so. I have a spare oxygen cylinder with me, so when I get there, I want you to lie still so I can connect the spare tank to your support system, okay?"

"Okay, but you had better hurry as I am slipping into something of a dark hole, and I am damn hot!" she said.

Frank was sweating himself now, and with a chilling sense of dread, he still couldn't see Kafira. He was concerned that, with the lack of oxygen, she could be slipping into a coma, as her voice was weak and croaky. He bounced along as hard as he could, knowing that if he went too fast, he would be likely to fall, which wouldn't be all that smart. His adrenaline was high, and his heart rate was too fast, but he was focused on getting to Kafira in time.

Mission Time: 1 hour and 46 minutes

At last, Frank could see her. She was lying on her back in the dust about twenty yards to his left. He bounced the last few yards to her still body. "Kaffie, can you hear me? Kaffie?" She didn't answer. Frank threw the emergency oxygen cylinder on the ground and unscrewed the cap on her pack. Kafira wasn't moving. He lifted her visor, his heart beating through his chest. *Shit!* His stomach jumped. Her face was turning blue; her eyes were open but unfocused, and sweat was running down her face into her suit. Frank's fumbling, shaking hands wrenched open the nozzle of the cylinder, screwed it to the external connector on the support pack, and turned on the emergency oxygen tank valve. Nothing happened. "Oh, come on!" he cried out. There was no pressure, and certainly, no oxygen issued into Kafira's life support system.

"What's happening down there? Frank?" said Paul, his voice uneasy.

Frank was now terrified and almost paralysed with fear. This was the only opportunity he had to save her. Any hope of getting her back to the module and into the cabin atmosphere was impossible. It would be at least a ten-minute trek, and despite the low gravity, with Kafira unconscious, she wouldn't be able to assist him. He knew she would certainly become cyanotic before they reached the Lunar Module. "There's no oxygen getting through to her support system from the spare oxygen cylinder, and it's pretty clear that her support system is shutting down. She's turning blue. Her heart monitor is going crazy!" He looked at her eyes again. He saw that they were still open, but seeing nothing.

"Paul, Kaffie is going to die unless I can do something." Frank felt useless. Watching Kafira die like this was not the way they envisaged they would complete the mission. He leaned down, wrapped his arms clumsily around her, and stared at her face. She was beautiful and intelligent, and the first woman to walk on the Moon. Now it appeared that she would be the first woman to die on the Moon.

Mission Time: 1 hour and 49 minutes and 30 seconds

Paul's voice came over the intercom. "Are you sure that you screwed the connection down completely?" he said, somewhat harshly.

"I'm sure it was. I'll check again." Frank looked at Kafira's beautiful face, bloated and a terrible translucent blue. Her heart monitor was showing that it was in fibrillation. He reached for the valve and tightened it as far as it would go. Suddenly, he felt the rush of oxygen into the life support connection. He couldn't believe it. *How could I be so stupid? Of course!* He looked into Kafira's helmet, but couldn't see any evidence that she was receiving the oxygen. He shook her shoulder, to no effect. "Come on, Kaffie!" Now Frank was desperate. *How could I be so close and yet still lose her?* He pounded the ground and cried out in frustration. "Paul!" Frank bellowed. "I have been so fucking stupid! The diaphragm on the external connector wasn't punctured when I first attached the line connector. I didn't screw it down hard enough."

"Is she getting oxygen now?"

"Yes."

"How many minutes had elapsed before she started to receive oxygen?"

"I don't know. Maybe two- three minutes," Frank replied.

"Frank, you know that if Kaffie has been without oxygen for more than four minutes, it will be difficult to revive her and for her not to suffer any brain damage?" Paul's voice was now irritatingly calm.

"I know, Paul! I can only hope that there is now enough oxygen

flowing into the suit."

Frank looked at the digital pressure gauge on Kafira's wrist and saw that it read 1.9. That was good, but was it good enough, soon enough?

"Frank, I am going to be out of range in three minutes and will not be able to contact you for a further thirty-five minutes in the orbit. Do you think you can get Kaffie back to the module?"

"I have to, it doesn't matter what it takes," he replied. "Call me when you are back in range."

"Okay. Please look after her, and good luck!"

Frank peered into Kafira's helmet. It was possibly his imagination, but he thought that her face wasn't as blue as before. Her heart rate had also slowed down, but only slightly. *Thank God*, he thought. *Maybe she will get through this*.

Frank hooked the emergency oxygen cylinder to his suit belt, closed Kafira's visor, and bent down to hold her around her waist. He lifted her up. She wasn't exceptionally heavy, but the low gravity made it awkward. The best he could do was to cradle her in his arms and lope along. The cylinder banged at his side as he moved, but Kafira was still unconscious and didn't notice.

Mission Time: 2 hours and 10 minutes

After twenty minutes of slow going, they eventually arrived at the bottom steps of the Lunar Module. Kafira's suit pressure was back up to 2.0, and she was breathing. Now the challenge was to get her up the steps and into the module. Fortunately, for Frank, their module had an external electric hoist for lifting moon rock specimens into the spacecraft, so he secured Kafira to the hook and hauled her up to the hatch. Then, it was a relatively straightforward matter of pushing her limp body into the Lunar Module itself.

Frank lay Kafira down, closed and locked the hatch and repressurised the cabin. Her heart rate was reading 160, and her lips were still blue. The rest of her face was pale, but it wasn't quite so bloated. *This is better*, Frank thought. He looked at the cabin pressure—it was

now at 4.0. *I can remove her helmet at this pressure*. It wasn't difficult to remove the helmet, and he lifted it off her head in twenty seconds. Kafira stirred, and her eyes fluttered open.

"Frank," she whispered. "Wh- Am I back? Are we back in the LM?" The last thing she could remember was feeling as though she was falling into a black hole.

"Yes. You're back in the LM. We nearly lost you out there. What in the hell happened?"

"I don't know. One minute I was quite comfortable, the next—the suit pressure had dropped, and I couldn't get enough oxygen."

Frank looked at her with worry, but he was glad that she was okay. He took a plastic sachet with water and held a straw to her lips. "Here, drink this. You've lost a lot of fluid."

She squeezed the sachet and took a long sip of water through the straw

It was quite warm in the module was now, so Kafira sat up and started to take off her suit. Underneath she was soaked. She had been sweating profusely. She still felt terribly weak but was able to slip off the torso section and move herself to a position where she could remove her boots and the long pressure pants.

"Frank, I honestly don't know what happened. I do know that I saw a flash. After you told me to return, I turned around, and I saw it out of the corner of my eye. I don't know what it was, but that's when I tripped and fell on my back. I just don't understand how I could lose pressure so quickly."

Paul's voice came over the intercom, "Frank, I can't see you outside the LM. Is Kaffie all right?"

"Yes. Thank God! She is. If I hadn't fumbled the connector, she would have recovered on the ground. We hopped back to the LM together. She has improved to the extent that she feels reasonably comfortable and is talking to me."

"Okay, Frank. Glad you're still with us, Kaffie! We need to find out

why the suit lost pressure. I want you to examine that suit from top to bottom. I've reported to Mission Control that we've had an incident. I can now add that Kaffie is okay as far as you can tell, but Frank, keep an eye on her and take a quick blood sample just to be sure."

"Okay, Paul. Will do." He looked over at Kafira. "You heard him. Let's get a sample and we'll store it for analysis for when we get back."

They took the blood sample and Kafira wriggled her way out of the rest of her suit. Frank examined each item as it came off. He inspected the oxygen regulator and found that it was working properly. Next, the CO₂ connection and scrubber—no problems were evident. He removed the life support pack from the torso shell.

"What is that smell?" said Frank, scrunching up his nose. He glanced at Kafira.

"Don't look at me," she said, raising her eyebrows in confusion.

"Well, it's rotten whatever it is. And it's coming from your suit."

Frank looked down at the suit. There was a small, burnt, ragged hole in the fabric, about an eighth of an inch across and three sixteenth of an inch long, just about level with the lower waistband. The smell was coming from the hole, and it was now overpowering. Frank held his hand to nose. "How the hell did that get there?" he said. "Paul, I've found a three sixteenth of an inch long hole about waist level in the suit, and it smells terrible. Damned if I can think of how it got there. Hang on—there are some plastic pieces around the hole. Paul, I will have to get back to you after I examine this stuff."

Kafira crawled towards Frank. She looked at the hole in her suit. "How did that get there?" She examined it closer. "These plastic bits look like a piece of a capsule, and I know what that smell is."

"What?" said Frank?

She looked up at him. "It's sulphuric acid!"

"How did—That means that this was no accident. Someone must've deliberately hidden that capsule in the first fold of your suit." They shared concerned looks. "When you tightened the torso, it must have

crushed the capsule—the acid would've leaked out into the material and started burning it away. When I was carrying you back, I must have restricted the hole so that the oxygen leaked out at a slower rate."

"Thank God it did," said Kafira, staring at the ragged edges of the hole.

"Paul, we've got something serious here," said Frank as calmly as he could. "We've found a crushed capsule in Kaffie's suit. We think it contained sulphuric acid. This was no accident, Paul. The mission has been sabotaged."

"Shit! Okay. All right— Uh, Kaffie, you're going to have to exit again in a new suit to find out what in the hell is going on."

"I'm not sure she can handle it after this," said Frank.

"Rubbish!" yelled Kafira. "I need to find out three things—one: what is going on here? Two: what caused the flash that I saw? And three: was the source of the flash that I saw the same as the flash that Jamie said he saw from Earth? Someone obviously doesn't want us to find out what is up here. They failed to stop me in the first instance, and it's clear that my suit was sabotaged back on Earth. I think it's unlikely that any further attempt to stop me will happen up here."

"I agree, Kaffie," Paul said calmly. "Just be sure that you're up to it."

Mission Time: 2 hours and 55 minutes

Kafira didn't particularly want to exit the Lunar Module a second time. She still felt light headed, and her legs were still weak. She was now thankful for the SEAL training because she knew she could fight through the discomfort. She continued breathing pure oxygen to make her feel better, but she knew she could do it.

Frank, Paul, and Kafira had all agreed that, as a minimum, it was necessary to identify what produced the flash that Kafira had seen. This time both she and Frank checked and rechecked her suit before she climbed into it. There was an intact capsule in the second suit, in the same place as the first. It was removed and placed in a plastic bag to

take back to Earth. Kafira climbed into the new suit, and Frank then pressurised and stabilised her suit at the correct pressure.

Mission Time: 3 hours and 5 minutes

Kafira cautiously made her way to the point where she had tripped and fallen. There was a lot of disturbed dust but nothing else. She watched her readout carefully but didn't notice any abnormalities. She continued and turned right in the direction she had seen the flash. Within two hundred yards, she reached the edge of Poncelet—the remains of a lunar crater—and climbed its ridge. She wasn't all that far from where she was supposed to be part of the mission in the first place. Here, the ground sloped up towards the lip of the crater. It was enormous, and she knew from Charles that it was seventy miles across, and, from his calculation, about a mile deep in the middle.

As Kafira reached the rim, she was confronted by a drop of about five hundred yards to the sloping rocky floor below. She couldn't see anything unusual directly in front of her but then noticed that there was an odd disturbance in the rock formation on a rough ledge, five yards to her left. She thought she could get to the ledge, but would have to climb down a steep slope of about twenty yards to get to it. She knew she would be out of direct sight of Frank and the Lunar Module.

"Frank, I am climbing down into the crater to investigate some odd-looking formations."

"Okay, Kaffie. Take it easy, and tell me everything you see. And keep that camera rolling!"

Mission Time: 3 hours and 8 minutes

Kafira was especially careful not to fall again and made sure that every step she took was on solid ground before putting her weight on it for the next step. This obviously made for hard going, and her heart rate started to climb, but the suit pressure was still at 4.7. *Good*, she thought. *The regulator is adjusting to my respiration rate*.

Mission Time: 3 hours and 15 minutes

She was within five yards of what she thought was the disturbed

formation on the ledge, when out of the ground in front of her rose a periscope. Kafira gave an involuntary squeak and stopped. The top lens wasn't looking directly at her, but it was turning in a clockwise direction and would see her very soon.

"Frank, a periscope has just risen out of the formation that I saw. It hasn't seen me yet, but it will."

"Shit! Kaffie, for God's sake, get out of there!" shouted Frank.

Kafira thought quickly. If I can get up close and cling to the periscope tube, it won't be able to see me. She scrambled the last five yards towards the tube and put her back to it as it rotated. It worked! she thought. Well, at least, she hoped it worked.

Mission Time: 3 hours and 15 minutes and 30 seconds

Just as suddenly as it appeared, the periscope began to descend. Kafira ensured that the lens was facing away from her as it slid into the ground, and two large plates moved to cover the hole.

"Frank, whoever was on the other end of this thing probably didn't see me, but I can't be sure. I'm coming back to the LM," she said, breathlessly.

She quickly scrambled back up the slope and hopped down the other side of the ridge. Looking back, she thought that the top lens would only poke over the ridge by about a yard before it would scan three-sixty degrees of the surface around it. It must have been the sun reflecting off the lens that caused the flash she had seen before she tripped.

"Frank, I managed to get away from the periscope," gasped Kafira. "But I want you to focus on the point just to the right of where I fell, and if it appears again, please let me know and aim the top laser at the lens to blind it."

"Okay, just get back here quickly," said Frank, adjusting his field telescope on the spot indicated by Kafira through his triangular window and priming the laser at the same time. "Paul, I assume you heard that," said Frank.

"Yep, I sure did. Get her inside as quickly as possible, and we will then decide what to do while I alert Mission Control."

Mission Time: 3 hours and 20 minutes

Kafira made it back to the Lunar Module with Frank waiting to haul her in.

"Frank, Paul, I think we've stumbled upon something quite alien. Why hasn't this thing shown itself?" said Kafira, breathing heavily. "I'm sure the flash I saw was the sun reflecting off the top lens, but the lens wasn't aimed at me. I'm just going to check the timing here because I suspect that the periscope wasn't operated manually. If it were manned, it would have stopped to investigate, but it didn't. It just did one three-sixty degree scan and then lowered itself. It reminded me of the way a submarine Captain does a three-sixty degree sweep before surfacing to make sure there is nothing up there that he would run into."

"You might be right, Kaffie, but it hasn't risen since you reported it, and that was twenty minutes ago," said Frank.

"It could be operated on a timer. Look at the times that it has appeared. From the log, I saw the flash at 1:37. We came back to the LM at 2:10. Our backs were towards the crater, so we wouldn't have seen it rise again. The periscope appeared at 3:15 while I was in the crater. I think that it appears at timed intervals—probably once every half hour. What time is it now?" she asked, looking at Frank.

"3:21."

"Well, if I am right, it will appear again at 3:45 and at 4:15."

"Okay," said Paul, "I hear what you're saying, Kaffie, and Frank, I want to bring the launch sequence forward to 3:49."

"Okay," said Frank, "3:49 it is."

Kafira was exhausted. She was light-headed, and her arms felt like lead. She felt dirty and messy and longed for a long, hot shower. But this was not going to happen. All she could do was splash her face with the small amount of water from the bottle that they had on board, and

that was it.

While Frank prepared for the launch, Kafira was anxiously glancing at the digital clock and kept the field telescope focused on the crater's ridge.

"Frank, I did see a lot of disturbed ground down further to the right of the periscope. It looked as if there had been a dump of rocks—possibly man-made rocks. I can't be sure, though."

"Okay, the camera might have picked up some of what you're talking about. We will have to look at the film later when we get out of here."

At 3:45 precisely, the top of the periscope appeared. It made a thirty-second sweep and then disappeared.

"Gotcha!" said Kafira.

"Well it looks as if it is unmanned and on a timer, as you suspected," said Frank.

"Unmanned or not, someone must be seeing what it sees somewhere. The thing is, it must be able to see the LM and our activity outside," said Kafira with a frown. "Then again, maybe not," she mused. "Without going out there again and working out the angles, I can't be too sure. I don't think it could see me on the surface when I tripped, and if the timing is what we think it is then it's possible that it didn't see you leaving the LM either. But it can, quite obviously, *see* the LM. Why we haven't seen more investigation from it is beyond me."

"Paul, can we bring the launch sequence forward? This is becoming a bit scary, and the sooner we are out of here the better," said Frank.

"Most definitely," said Paul. "I heard Kaffie's explanation, and I agree."

"Thanks, Paul. I'll commence the launch sequence now. I will make ignition at 3:50. I will finish the check-off for that time." Frank and Kafira started getting themselves ready. "Okay, Paul, give us the countdown sequence," said Frank.

"Okay, here we go," said Paul calmly.

Kafira took one last look at the crater through the field telescope. "Uh, Frank, Paul, you aren't going to like this, but—Uh, the side of the crater—It's just opened up."

"What?" Paul shouted.

"There's a tunnel in the crater—about six yards wide. There's a-Oh, wow! There's a spidery, tub-like thing crawling out." She squinted and looked at the mysterious vehicle. "Is that—I think—It is! It's levelling a barrel at us!"

"Shit!" said Frank. "Paul, I'm starting the launch sequence to GO. Kaffie, strap yourself in."

Frank quickly checked the launch sequence list; satisfied, he ignited the lift motor. There was a shuddering throughout the module, as the blast from the motor lifted the ungainly craft off the platform and hurled it towards the Command Service Module. Kafira held her breath as the Lunar Module gained height. She looked back down towards the crater. She could see the tub-like vehicle stop and reverse. The rocks on the side of the crater slid back into place, and the tub-like vehicle disappeared. Meanwhile, the on-board camera was steadily clicking away on auto. Kafira expelled the breath she was holding. We are away, free.

"I can see you have lifted off and are gaining height," said Paul. "Stand by for docking."

Mission Time: 3 hours and 57 minutes

Frank expertly docked the Lunar Module, and he and Kafira crawled through to the Shuttle to be greeted by a grinning, Paul.

"What were you guys doing? Disturbing the natives?" he said jokingly.

"Seriously, Paul," replied Frank, not in a joking mood. "This is worrying stuff! That tub thing was about to fire at us."

"Okay, well we have twenty hours to go before re-entry. Kaffie

looks exhausted, and you don't look much better. You two get some rest while I talk to Houston."

Kafira could hardly keep her eyes open as she crawled into her sleeping bag. Within five minutes, she was fast asleep.

Tuesday, 13 November 1984

Several hours later, Kafira was woken by Frank shaking her gently.

"Okay, Kaffie, we are in the docking position. Rise and shine - it's time for re-entry!" It was Tuesday, 13th November 1984.